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Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended) A design support apparatus for a resin mold product made of thermosetting resin, comprising:

a flow analysis means which analyzes a flow of thermosetting resin injected into a resin filling cavity to mold said resin mold product, using a finite difference method or a finite element method;

a residual strain calculation means which calculates residual strain ~~(or stress)~~ of the thermosetting resin after heat shrinkage of the thermosetting resin injected into the resin filling cavity to mold said resin mold product; and

a strength analysis means which analyzes strength of said resin mold product, using a finite element method;

wherein:

said flow analysis means indicates a reaction rate model by using an equation

$$A(t) = Q(t) / Q(o)$$

wherein A(t) is reaction rate whose initial value at the reaction is 0, and the reaction rate in the initial period is saturated toward 1 with lapse of time,

t is time,

Q(t) is heat release value until time t,

Q(o) is a gross heat release value until the end of the reaction,

and calculates viscosity η , coefficient of elasticity E(T), and linear curing strain

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component ϵ_1 by replacing the changes of each component with change of the reaction rate $A(t)$.

said flow analysis means calculates a temperature, a coefficient of elasticity and a strain (~~or-stress~~) component of the thermosetting resin at a time of heat curing, for each of first three-dimensional solid elements used for flow analysis and gives the calculated result to the residual strain calculation means;

said residual strain calculation means uses correspondence between each of second three-dimensional solid elements used for strength analysis by said strength analysis means and each of said first three-dimensional solid elements, and the temperature, the coefficient of elasticity and the strain (~~or-stress~~) component calculated for each of said first three-dimensional solid elements by said flow analysis means, in order to set a temperature, a coefficient of elasticity and a strain (~~or-stress~~) component at the time of heat curing for each of the second three-dimensional solid elements, and calculates residual strain (~~or-stress~~) after the heat shrinkage for each of said second three-dimensional solid elements; and

said strength analysis means sets the residual strain (~~or-stress~~) after the heat shrinkage, which is calculated by said residual strain calculation means, to said each of said second three-dimensional solid elements, and analyzes the strength of said resin mold product.

Claim 2 (Currently Amended) The design support apparatus for a resin mold product, according to Claim 1, wherein:

said flow analysis means calculates changes of a temperature and athe reaction rate expressed as functions of time, and a change of a viscosity expressed

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as a function of the reaction rate, for each time step and for each of said first three-dimensional solid elements, and further

for each of first three-dimensional solid elements whose reaction rates reach a reaction rate of gelling, said flow analysis means calculates the strain ~~(stress)~~ component at the time of the heat curing, based on a relation between athe reaction rate and a specific volume, and calculates the coefficient of elasticity at the time of the heat curing, based on relations of a reaction rate, ~~and temperature to~~and a coefficient of elasticity.

Claim 3 (Currently Amended) The design support apparatus for a resin mold product, according to Claim 1, wherein:

said residual strain calculation means sets a representative point to each of said first three-dimensional solid element and each of said second three-dimensional solid element;

for each of said second three-dimensional solid elements, said residual strain calculation means calculates averages of temperatures, coefficients of elasticity and strain ~~(or stress)~~ components of at least one of said first three-dimensional solid elements whose representative points are close to a representative point of a second three-dimensional solid element in question, weighting said temperatures, said coefficients of elasticity and said strain ~~(or stress)~~ components according to distances of said representative points from the representative point of said second three-dimensional solid element in question; and sets the calculated averages as a temperature, a coefficient of elasticity and a strain ~~(or stress)~~ component to said second three-dimensional solid element in question.

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Claim 4 (Currently Amended) The design support apparatus for a resin mold product, according to Claim 1 wherein:

for each of said second three-dimensional solid elements, said residual strain calculation means calculates residual strain, using the temperature, the coefficient of elasticity and the strain ~~(or stress)~~ component set to a second three-dimensional solid element in question, and using a variation of coefficient of elasticity in a case where said temperature is cooled down to a predetermined temperature.

Claim 5 (Original) A computer-readable medium having a program readable by a computer, wherein:

when said program is executed on said computer, said program implements the flow analysis means on said computer, which is used in the design support apparatus of Claim 1 for a resin mold product.

Claims 6 and 7 (Cancelled)

Claim 8 (Currently Amended) A method of supporting design of a resin mold product, where a computer is used to support design of a resin mold product made of thermosetting resin, ~~comprising:~~ by implementing the operations of:

a flow analysis step in which a finite difference method or a finite element method is used to analyze a flow of thermosetting resin injected into a resin filling cavity to mold said resin mold product;

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a residual strain calculation step for calculating thermosetting resin's residual strain ~~(or stress)~~ after heat shrinkage of the thermosetting resin injected into the resin filling cavity to mold said resin mold product; and

a strength analysis step in which a finite element method is used to analyze strength of said resin mold product;

wherein:

in said flow analysis step

a reaction rate model is indicated by by using an equation $A(t) = Q(t) / Q(o)$

wherein $A(t)$ is reaction rate whose initial value at the reaction is 0,

and the reaction rate in the initial period is saturated toward 1 with lapse of time t,

$Q(t)$ is heat release value until time t,

$Q(o)$ is a gloss heat release value until the reaction ends,

and wherein viscosity η , coefficient of elasticity $E(T)$, and linear curing strain component ϵ_1 are calculated by replacing the changes of each component with the change of the reaction rate $A(t)$.

in said flow analysis step, a temperature, a coefficient of elasticity and a strain ~~(or stress)~~ component of the thermosetting resin at a time of heat curing are calculated for each of first three-dimensional solid elements used for flow analysis;

in said residual strain calculation step, correspondence between each of second three-dimensional solid elements used for strength analysis in said strength analysis step and each of said first three-dimensional solid elements, and the temperature, the coefficient of elasticity and the strain ~~(or stress)~~ component calculated for each of said first three-dimensional solid elements in said flow

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analysis step are used in order to set a temperature, a coefficient of elasticity and a strain ~~(or stress)~~ component at the time of heat curing for each of the second three-dimensional solid elements, and residual strain ~~(or stress)~~ after the heat shrinkage is calculated for each of said second three-dimensional solid elements; and

in said strength analysis step, the residual strain ~~(or stress)~~ after the heat shrinkage, which is calculated in said residual strain calculation step, is set to said each of said second three-dimensional solid elements, and the strength of said resin mold product is analyzed.

Claim 9 (New) A design support apparatus for a resin mold product made of thermosetting resin according to claim 1, wherein

in the flow analysis means the reaction rate $A(t)$ for a time period t is calculated from equations 1-5 as given below:

$$\partial A(t) / \partial t = (K_1(T) + K_2(T)A(t)^M) (1-A(t))^N \quad \dots \text{Eq. 1}$$

$$K_1(T) = K_a \exp(-E_a/T) \quad \dots \text{Eq. 2}$$

$$K_2(T) = K_b \exp(-E_b/T) \quad \dots \text{Eq. 3}$$

$$A(t) = Q(t)/Q_0 \quad \dots \text{Eq. 4}$$

$$\partial Q(t) / \partial t = Q_0(K_1(T) + K_2(T)A(t)^M) (1-A(t))^N \quad \dots \text{Eq. 5}$$

wherein A refers to a reaction rate; t to time; T to temperature (molding condition, function of time t); $\partial A(t) / \partial t$ to a reaction rate; $K_1(T)$ and $K_2(T)$ to coefficients as functions of temperature; N , M , K_a , K_b , E_a and E_b to intrinsic coefficients of the material; $Q(t)$ to a heat release value until time t ; Q_0 to a gross heat release value until the end of the reaction; and $\partial Q(t) / \partial t$ to a heat release rate, and the viscosity η is calculated from equations 6-7 given below

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$$\eta = \eta_0 (T) \left((1 + A/A_{gel}) / (1 - A/A_{gel}) \right)^{C(T)} \dots \text{Eq. 6}$$

$$\eta_0 = a \exp (b/T) \dots \text{Eq. 7}$$

$$C = f/T - g \dots \text{Eq. 8}$$

where, η refers to a viscosity; η_0 to an initial viscosity; T to temperature; A to a reaction rate; A_{gel} to a reaction rate at gelling; C to a temperature-rise coefficient; and a , b , f and g are intrinsic viscosity parameters of the materials, and the coefficient of elasticity $E(T)$ is calculated from an equation given below,

$$E(T) = E_{gel}(T) + (E_0(T) - E_{gel}(T))(A - A_{gel}) / (1 - A_{gel}) \dots \text{Eq. 14}$$

wherein, $E_{gel}(T)$ refers to the coefficient of elasticity at gelling at the temperature T ; $E_0(T)$ to the coefficient of elasticity at the end of the reaction at the temperature T ; and A_{gel} to the reaction rate at gelling, and

the linear curing strain component ϵ_1 is calculated from an equation given below:

$$\epsilon_1 = \Phi \Delta A \dots \text{Eq. 18}$$

wherein Φ refers to a linear curing shrinkage coefficient; ΔA to the reaction rate at curing minus the reaction rate at gelling.